Kim Cooper Final Lesson Plan

**Lesson: Filtering Water**

Grades: 2 and 3

Time: 1 class period

**Description**

Students will use their knowledge from previous lessons on water, the water cycle and water contamination to support this experiment. The experiment will introduce the concepts of reusable water, drinkable water and water filters.

**New York Scope and Sequence Standards:**

PS 2.1d Explore how erosion and deposition are the result of interactions between air, water, wind, and land.

PS 2.1c Describe and illustrate the natural processes by which water is recycled on earth

PS 3.1b,c Describe and compare the physical properties of matter

PS 3.2 a, b Water is recycled by natural processes on earth

**Danielson Standards:**

1e Planning and Preparation- Designing Coherent Instruction

2b The Classroom Environment- Establishing a culture for Learning

3b Instruction- Using Questioning and Discussion

3c Instruction- Engaging students in Learning

3d Instruction- Using Assessment in Instruction

Essential Question

***How can we use our knowledge of earth materials and water to create a system to purify water so that is can be reused and drinkable?***

**Objectives**

Students will:

* Be able to determine the quality of the water sample they brought in and design a water filter
* Design and plan which materials they will use to make their water filter
* Work in a small group to create a water filter

**Materials**

* Video: *The Groundwater Story*
* <http://www.kingcounty.gov/environment/waterandland/groundwater/education/animation.aspx>
* Vials
* Water samples
* Empty bottles
* Filter materials (coffee filters, cloth, sand, pebbles, clay, cotton, stockings)
* Clear open containers for evaporation
* Science notebooks for planning, designing, observations and results
* Computer and smart board

**Procedures**

1. Students will collect samples of soil from sources outside of school for homework prior to the experiment.
2. Teacher will label each soil sample with its origin and randomly distribute the samples to student groups to observe and describe, taking note of the color, grain size, other living/nonliving particles and odor.
3. Given a bottle and tap water, each group will mix some soil and water and shake it up.
4. Discuss the natural process of erosion and deposition with the class
5. Video- Watch Video: *The Groundwater Story*. Discuss how our earth naturally filters water and makes it reusable again.
6. Post the essential question: ***How can we use our knowledge of earth materials and water to create a system to purify water so that is can be reused and drinkable?*** Have students discuss and share their ideas of how to clean the water samples. The teacher will explain that in our water system, the water needs to be cleaned or “filtered” before it can be drank.
7. Show the students various materials that might be useful for filtering water: coffee filters, cloth, sand, pebbles, clay, cotton, stockings. Let students know that they are welcome to use other materials in their filters if they can acquire them easily. Tell students that they their groups will choose 2-5 different materials in their filter.
8. Have students keep 1 vial of the unfiltered water sample so that they can compare to the filtered water later. Put aside.
9. Next, each group draws and writes a plan for creating their filter.
10. **Possible breaking point**
11. Have students gather the materials they will need to create their water filter. Then, they may begin construction.
12. Once the filter is completed, slowly pour the unfiltered water into the filter. The students will compare the properties of the original sample to the filtered sample.
13. Reflection- Lead the class in a discussion of what material made the best filters. Is your water drinkable? Reusable? If not, how would you revise your filter to improve it?
14. Assess- Ask students to write a paragraph in their notebook:

* ***What is a water filter?***
* ***Explain why water filtering is important.***

**Assessment**

Students will be assessed with the following rubric:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Students will be able to…** | **1**  **Novice** | **2**  **Apprentice** | **3**  **Proficient** | **4**  **Distinguished** |
| **Works in a group to plan, design, create, test and improve** | Student does not successfully implement any of the steps of the design process | Students implements as least some of the steps of the design process | Student independently, correctly and completely goes through the design process. | Student is proficient and goes significantly beyond in the design process. |
| **Use prior knowledge of the properties of materials to inform a water filter design** | Student does not successfully use prior knowledge to inform the design of water filter | Student uses prior knowledge to inform water filter. Not all information is correctly used, or student requires significant support. | Student correctly and completely uses prior knowledge to inform their design. | Student participates at proficient level and goes significantly beyond (creates questions for further investigation) |
| **Design, Test and Evaluate a water filet** | Student does not successfully design, test or evaluate their water filter design.  Or  Student did not conduct the experiment . | Student designs, tests and evaluates his/her water filter design. Work is partially accurate. Student may require significant support. Student works mostly independent of his peers and does not use appropriate strategies when designing their filter. | Student completely and accurately designs, tests and evaluates their water filter. Student works with their peers in a productive manner and uses some strategies when designing their filter. | Student participates at proficient level and goes significantly beyond  Student works cooperatively with their peers and uses intuitive strategies when designing their filter. |